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T H E

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THE QUADRUPEDS OF ARIZONA.

BY DR. ELLIOTT COUES, U. S. A.



(Continued from p. 363.)

FAMILY *Sacomys*, the Pouched Rats. This is a curious and interesting family of Rodents, represented in Arizona by quite numerous species. Its several genera differ to a remarkable degree in external characters, but agree in the possession of very large cheek pouches, opening outside the small mouth, and capable of enormous extension; and in numerous anatomical features. Two subfamilies exist in North America,—the *Geomyina*, and the *Sacomys*. The former includes the "Gophers" or "Salamanders" or "Pouched Rats," as they are variously styled in different sections. They are clumsy, thick-set animals, with large heavy heads, short thick necks, small inexpressive features, short tails, and very strong muscular legs, armed with large claws, eminently fitted for digging. They are also wholly nocturnal, and live in subterranean galleries which they excavate. The *Sacomys*, on the other hand, are elegant in shape, of pleasing colors, and graceful motions; and though par-

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tially subterranean and nocturnal, often come abroad in the daytime. They are known in the vernacular as "Kangaroo" or "Jumping" Rats and Mice, and are entirely confined to Transmississippian regions. The largest species is about as big as a third-grown rat, while the smallest is among the most diminutive of all our animals, unless some of the shrews are still less in size. These animals have well-formed bodies, very large and muscular thighs, small hands, large rounded ears, full protuberant eyes, and very long tails, often tufted at the end. Their fur is peculiarly soft and lustrous.

The two genera of the *Geomyinæ*, though very similar to each other, are distinguished, among other features, by the absence in *Thomomys* of the deep central longitudinal grooves in the upper incisors which exist in *Geomys*. The latter is hardly known west of the Rocky Mountains, nor the former to the eastward of them. Though two other species may occur in Arizona (*Thomomys bulbivorus* from California, and *T. umbrinus* from Sonora), only one, the Red Sand-rat (*T. fulvus*) is at all common. It was discovered by Dr. Woodhouse in the vicinity of the San Francisco Mountains, where it is exceedingly abundant. It lives mainly in light sandy or loamy soil, such as may be readily excavated. The soft soil of grassy hill-sides, or sloping meadows, especially in the vicinity of oaks, or clumps of nut-bearing trees, are favorite resorts, as it finds there an abundance of acorns, seeds, and grasses, upon which it feeds. The succulent stems and roots of many herbs also furnish it with food. Wherever it takes up its abode, little piles of fresh moist earth may be seen in every direction, sometimes scores within a radius of as many yards. These are especially noticeable in the morning, for the animal is strictly

nocturnal, never working, and rarely venturing from its burrow in the daytime. During the night it is very industrious, both in collecting food and in enlarging its galleries; and the amount of fresh earth visible one day, where none had been the day before, is sometimes astonishing. Should Arizona ever become a cultivated region, this gopher would be wellnigh as great a pest to the farmer as the *T. bulbivorus* and *Spermophilus Beecheyi* are in California. We were much annoyed by their digging around, and partially undermining our tents, causing the canvas flooring to slump in when trodden upon. Pouring water in their holes, or plugging them up with sticks, seemed to take effect mainly as a provocation to them to dig others. Though thus daily "bored"—literally and figuratively—by these beasts, I never saw one in a state of nature, and only procured two specimens in as many years. It is notorious that a person may live surrounded by them for years, and never see one, so timid and retiring are they, and so strictly nocturnal.

The Pouched Kangaroo Rat (*Dipodomys Ordii*) is the main representative of its subfamily in Arizona, and extends also over New Mexico, Texas, and part of Mexico. A closely allied species (*D. Philippii*) replaces it in California. It is one of the most abundant of the Rodents about Fort Whipple, where it more nearly takes the place of the house rat and mouse than any other native species, except an *Hesperomys*, to be presently noticed. It is beautiful in form and colors, and its motions are agile and graceful. Above, it is of a clear fawn color, deepening along the middle of the back into brownish gray; the whole under parts are pure silvery white, which color also forms an artistic contrast to the fawn, by striping the head and thighs. The long tail, tufted near the end,

is mouse-gray above and below, and pure white on its sides. The fur is peculiarly soft, smooth, and lustrous. It chiefly inhabits loose sandy soil, like a gopher, though its "sign" differs greatly from that of the last named; but it is not entirely subterranean in habit, as it may be found living in piles of brush, fallen logs, etc. Though it labors at its domicile, and collects food mainly by night, it should not be called a nocturnal animal, any more than a House Rat, though the latter is liveliest and most plaguey after dark.

Since the erection of buildings in the interior of Arizona, the Kangaroo Rat has in a measure taken up its residence about them, showing the same adaptability to semi-domestication that the House Mouse exhibits. Many used to live in our storehouses and granaries at Fort Whipple, and even brought forth their young there, in just such nooks as the common mouse would select. Parturition occurs in May or June, though more than one litter may be produced in one season. The young are for some time much darker and grayer than their parents. Although sullen, and apparently much cowed when first caught, these rats soon become familiar, and make agreeable pets. I have frequently seen them enter my tent at night, when all was still, and search about for food. They ordinarily move on all-fours, with a motion not unlike that of a rabbit when leisurely moving about. The body is alternately strongly arched and extended; the long hind feet rest on the ground to the heel, and the heavy tail trails straightly after. If frightened, this easy motion is changed to a succession of astonishingly vigorous leaps. Perhaps the most beautiful features of these animals are their eyes, which are round and full, glossy black, and softly brilliant.

Another genus of Pouched Mice (*Perognathus*) occurs in Arizona. Its species much resemble those of *Dipodomys* in general appearance. Prominent amongst them is the *P. penicillatus*, also discovered by Dr. Woodhouse on the San Francisco Mountains. It is the largest species of its genus in the United States. Two others known to occur are *P. flavus* and *P. parvus*, both of which are among the most diminutive of all our animals. Little is known of these comparatively rare animals, though it is presumed that their habits are in general similar to those of *Dipodomys*.

Family *Muridæ*, the Rats and Mice. A species of this extensive family—the *Jaculus Hudsonius*—is also called the “Kangaroo” or “Jumping” Mouse, but must not be confounded with the preceding. It belongs to the same subfamily (*Dipodinae*) as the Jerboa (*Dipus sagitta*). It has no cheek pouches, and is otherwise conspicuously different from any member of the *Sacomysinae*. It is of very extensive diffusion throughout North America, though I believe its actual occurrence in Arizona requires confirmation.

Exclusive of the *Dipodinae*, the *Muridæ* are represented in North America by two subfamilies: the *Murinae*, or true rats and mice, and the *Arvicolinae*. The latter is composed of the Meadow-mice (*Arvicola*), the Musk-rats (*Fiber*), and the Lemmings (*Myodes*). The first subfamily is usually divided into the *Mures*, or “Old World Rats,” as they are called, and really were originally, though they are now cosmopolite; and the *Sigmodontes*, or “New World Rats,” embracing such forms as the Cotton Rats (*Sigmodon*), the Bush Rats (*Neotoma*), and the Field-mice (*Hesperomys*). I am not aware that any “Mures” have as yet made their way into the central and

unfrequented portions of the Territory, though the usual number of them exist at our various footholds on the Colorado River. In the interior, the indigenous species hold full sway, or at least did so two or three years ago,—the time of which I write,—though since then the Brown Rat (*Mus decumanus*), and the House Mouse (*Mus musculus*) may have migrated all over the Territory, or been transported wherever the white man has settled.

The genus *Hesperomys* is, perhaps, the best represented of the *Sigmodontes*. At least one species (*H. eremicus* Baird) is very abundant, both along the Colorado valley and the interior of the Territory. I found it very numerous at Fort Whipple, where it in a great measure seemed to abandon its primitive habits, and take up its residence as a veritable house mouse in buildings, particularly our granaries and store-rooms. It was sufficiently numerous to become quite an annoyance, sharing the plunder and comfortable home with the Kangaroo Rats. It ordinarily lives in bushes, brush-heaps, scrubby trees, etc., where it builds a somewhat bulky nest, of a globular shape, of grasses compactly matted together, and warmly lined. Another species (*H. Sonoriensis*) which I have never personally met with, occurs in the southern portions of the Territory. Mr. Clarke says that it seems to live, as circumstances may determine, either in the ground or in hollow trees. The species (or perhaps only variety of *H. leucopus*) called *H. Texensis* by Dr. Woodhouse, may also occur in South-eastern Arizona.

The genus *Reithrodon* (of which the little Harvest-mouse of the Southern States (*Reithrodon humilis*) is a typical species) is very similar to *Hesperomys*, but the upper incisors are longitudinally grooved instead of being

perfectly smooth. Those species most likely to occur are *Reithrodon montanus* Baird, of which the type is from the Rocky Mountains in latitude 39°; and *R. megalotis* in the regions contiguous to Sonora. They must either be quite rare, or of very inconspicuous habits.

The Bush Rat (*Neotoma Mexicana*) is abundant throughout the Territory, and forms no small item in the economy of the Indians. Not only the numerous tribes of the Colorado, but also the various branches of the Apaché family, make great use of them as an article of food. After the destruction of Apaché "rancherías," we always found, among other implements and utensils, numerous sticks, about as big as walking-canes, one end of which was bent in the shape of a hook, hardened in the fire, and a little sharpened. These, I was informed and have every reason to believe, were used to probe holes and poke about brush-heaps for rats, and to drag them out when discovered.

This statement may be doubted by those who know of the Bush Rat only as an arboreal species, building a compact globular nest of grasses and sticks in mezquite and other low thick trees. While this is certainly the case, there is no doubt that, under different circumstances, it may live underground, among rocks, or in brush-heaps. I have seen many heaps of rushes, sticks, and grasses, which could have been the work of no other animal, and formed either the nest itself, or the "vestibule" of a subterranean abode. I have also been informed to the same effect by several hunters and good observers. Dr. Kennerly has found it living under stones. It shows no tendency to modify its primitive habits by taking up its residence with man.

The food of these rats is entirely vegetable, and ob-

servers agree in noting their particular fondness for mezquite beans; both the long straight pods of the *Algarobia glandulosa*, and the curious spirally-twisted fruit of the "screw-mezquite" (*Strombocarpa pubescens*). As might be expected from the nature of their food, their flesh is excellent eating.

The idea of eating rats is doubtless disgusting to most persons—not Chinese nor Indian; but all such must remember that they take their notions from the House Rat, which is a dirty beast, feeding upon sewerage, garbage, and any decaying animal or excrementitious matter which may come in its way. The Bush Rat's food is as cleanly as that of a hare or squirrel, and there is no reason why its flesh should not be as good, as in truth I can assert it to be, having eaten it myself.

Arizona seems remarkably deficient in Meadow-mice (*Arvicola*). I am not aware that any species has been recorded from within its limits. At least one exists, however, as I know, having taken some fragments, too much mutilated for identification, from the stomach of a large hawk.

The Musk-rat, or Ondatra (*Fiber zibethicus*), so extensively diffused over North America, finds a place in Arizona, and is common on many of its streams. It is said that this animal and the beaver cannot live harmoniously together, the one harassing and finally dislodging the other; but I cannot vouch for the truth of the assertion.

The Indians make considerable use of Musk-rat skins for quivers, a number of them being sewn together, though a single skin of some larger animal, as a lynx, is usually preferred.—*To be concluded.*